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History and Reorganization. Dehorning Cattle

University of Tennessee Agricultural Experiment Station

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BULLETIN
OF THE
AGRICULTURAL EXPERIMENT STATION,
OF THE
UNIVERSITY OF TENNESSEE,
STATE AGRICULTURAL AND MECHANICAL COLLEGE.

Vol. I.

APRIL, 1888.

No. 1.

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- I. HISTORY AND REORGANIZATION.
II. DEHORNING CATTLE.
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KNOXVILLE, TENNESSEE,
U. S. A.

m. 5. 13.

Article I.—HISTORY AND RE-ORGANIZATION.

BY THE DIRECTOR.

The Agricultural Experiment Station of the University of Tennessee grew out of its School of Agriculture, Horticulture and Botany. The experimental work of this school was inaugurated by Prof. J. M. McBryde, who was at its head from June 1879 to June, 1882. Three reports, 150—200 p p. each, on experimental work, for the most part field and feeding experiments, were published during this period. They commanded favorable attention in and out of Tennessee. The success of this work led to the establishment of the Station by the following action of the Board of Trustees, taken June 8th, 1882:

In order to increase the efficiency of and give wider usefulness to the Agricultural Department of the University of Tennessee, and bring it into closer relations with the farming interests of the State, by affording to the Commonwealth the advantages to be derived from the practical results of experiments persistently prosecuted through a series of years, the Board of Trustees hereby establishes and inaugurates, upon the College Farm, an Experiment Station, which shall be a distinct department for the promotion of the general interests of agriculture in Tennessee.

1. This department shall be conducted under the general management of a committee of the Board of Trustees, which shall be denominated "The Board of Control," and shall consist of five members, who shall be elected annually by the Board of Trustees. The Board of Control, in addition to the duties that shall be devolved upon it touching the Experiment Station, shall also discharge the duties heretofore appertaining to the Farm Committee, which is hereby abolished.

2. The work of the Experiment Station shall be under the administration of a Director, who shall be charged with the oversight and conduct of the experiments, investigations, etc., contemplated in the erection of the Station.

3. The Experiment Station shall be furnished with a chemist as assistant to the Director, to whom the chemical part of the work, especially of analysis, shall be entrusted.

4. The Director and Chemist shall be under the supervision of the Board of Control and directly responsible to the Board of Trustees, and the work required in the prosecution of the business of the Station shall not interfere with the discharge of any of the duties appertaining to the professional chairs of any members of the Faculty who may hold positions in the Station.

5. The accounts of the Station for all experimental work shall be kept separate and distinct from those of the Farm, as far as practicable.

6. As the object of the Experiment Station is to be the promotion of the agricultural interests of Tennessee, by practical and scientific experimentation and investigation, the Station shall hold itself ready to make for the citizens of Tennessee analyses of seeds, fertilizers, soils, minerals, etc., under the following conditions, viz:

The results must promise to promote the cause of agricultural progress, to prove of interest to the public, and be free for publication. Such experiments or analyses shall be made without charge, provided, the samples furnished are made in accordance with the instructions that will be furnished

on application. Botanical determinations, analyses of drinking waters and other work of benefit to the public, will fall under this head.

No more work shall be done by the Station than the means of the University will allow.

All analyses shall be made in the order of the arrival of the samples and at the discretion of the authorities of the Station.

Examinations and analyses for the benefit of private parties will be made on reasonable terms.

The Board of Control shall elect their own Chairman.

The details of the practical working of the Experiment Station is committed to the Director, subject to the approval of the Board of Control.

Appropriations of money for the prosecution of the ends of the Station shall only be made by the Board of Trustees.

Prof. McBryde resigned to take the presidency of the University of South Carolina, and Prof. Jno. W. Glenn, who was elected Professor of Agriculture, Horticulture and Botany in this University became the first Director of the Station in June, 1882.

The General Assembly of 1883 required the chemist of the Station to make the analyses of fertilizers for the State Department of Agriculture. In return for this, the Experiment Station received a small revenue, from \$700 to \$1,000 per annum, from the tax upon commercial manures.

The Station never enjoyed any fixed, or settled income until the present year. The Trustees of the University voted it such funds as they could spare from time to time from the general treasury. The amount from this source, not including salaries, which the officers received as professors, was necessarily very limited. In spite of these difficulties, considerable and valuable work was done, chiefly field and feeding experiments.

Prof. Glenn continued in office until June, 1887. Prof. W. A. Noyes was chemist to the Station from October 1883 to June 1886, and Prof. W. E. Moses from 1886 to the present time.

During this period the Station published a number of Bulletins and Reports.

On the 24th of July, 1887, the Board of Trustees elected Dr. Charles W. Dabney, Jr., Director, with authority to propose a plan and nominate officers for the reorganization of the Station which the General Assembly had made the recipient of the funds appropriated by Congress by the so-called, "Hatch Experiment Station Bill."

Prof. Charles S. Plumb was elected to take charge of field and feeding experiments and entered upon his duties on October 11th, 1887. Mr. Clifford L. Newman became assistant in the Experiment Station on September 1st, 1887.

As the promised funds were delayed and were considered by some uncertain, and as the Station had very limited resources of its own, it was necessary to proceed very cautiously. Some ex-

perimental work was started at once, however, and has been kept up constantly.

We found the Station without a laboratory of its own, without apparatus, library, etc.,—without everything, in short, which it takes to make a scientific station, and really having no existence, either in substance or in spirit, outside of the University and its farm. For seven months of this fiscal year, from July to February, the Station was almost wholly without funds, with which to carry on work. The University advanced the Station moneys, and some experimental work was undertaken. Under such circumstances, stock experiments, and work in the plant house and in the chemical laboratory of the University, was all that was open to us. What was accomplished under these disadvantages, this and future Bulletins will show.

As soon as the funds for the support of the Station were assured, the organization was further completed by the election of Prof. F. Lamson Scribner, Botanist and Horticulturist; Mr. W. E. Stone, Chemist and Prof. Henry E. Sumners, Entomologist.

The present organization of the Station is as follows:

DIRECTOR:

CHARLES W. DABNEY, JR., PH. D. (Göttingen.)

University Virginia; Professor Chemistry and Mineralogy Emory and Henry College; State Chemist, Director North Carolina Agricultural Experiment Station; Chief Department Government and State Exhibits World's Exposition, New Orleans.

ASSISTANT DIRECTOR, In charge of field and feeding experiments:

CHARLES S. PLUMB, B. S.,

Massachusetts Agricultural College; Assistant Editor Rural New Yorker; Assistant Director New York Agricultural Experiment Station; Editor "Agricultural Science."

BOTANIST AND HORTICULTURIST:

F. LAMSON SCRIBNER, B. S.,

Maine State College; Professor Girard College; Botanist Northern Transcontinental Survey; Mycologist United States Department of Agriculture.

CHEMIST:

WINTHROP E. STONE, B. S.,

Massachusetts Agricultural College; in charge Houghton Farm Experiment Station; Assistant Chemist and Biologist Massachusetts Experiment Station; University Göttingen.

ENTOMOLOGIST:

HENRY E. SUMMERS, B. S.,

Cornell University; Fellow Comparative Anatomy, Cornell 1886-7; Entomology and Comparative Anatomy 1887-8; Instructor in Veterinary Science, Cornell,

ASSISTANT, In field and feeding experiments:

CLIFFORD LEWIS NEWMAN, B. S.,

Agricultural and Mechanical College of Alabama; Assistant Alabama Agricultural Experiment Station.

A special building for the Experiment Station is in process of erection, which is to contain the offices of the Station, a laboratory for chemistry, botany and biology each, a library and reading room, a lecture hall, etc. A tool and seed-house has been built and partly supplied. Over 250 varieties of fruit trees and small fruits have been set out, as the beginning of the Horticultural Department. Extensive experiments on grasses and forage plants have been started and a plant house has been put in shape for experimental work. A milk laboratory is being erected and equipped at the farm, where some studies of questions underlying successful dairying are to be carried on. Without making any large promises, we will say that the Station is being put into shape as rapidly as is consistent with safe progress and will endeavor to do good and faithful work for the farmers of Tennessee and the country.

This Agricultural Experiment Station will issue three classes of publications, viz:

1. Annual Reports.
2. Regular, quarterly Bulletins.
3. Special Bulletins, at irregular intervals.

The Annual Reports will contain the full, regular reports from the different departments in the Experiment Station, and will probably form pamphlets or volumes of 100 to 150 pages. These reports will give detailed accounts of experiments made and the results obtained, so far as it will be useful to publish them.

The Quarterly Bulletins will give briefer papers outlining the work done and the results obtained, in cases where earlier publications are necessary.

The Special Bulletins will be issued as circumstances may require, to give the farmers of the State information which may be urgently needed, and, which, without requiring long experiments may be worth communicating at that particular time, or will answer numerous inquiries.

These bulletins and reports will be issued in uniform style, so that they can be bound together. Each year's publications will make, thus, a volume of, perhaps, from 250 to 300 pages.

The sections of the law referring to the work of the stations and to these bulletins and reports, is appended hereto. We are required to send all of these bulletins or reports "to such individuals actually engaged in farming as may request the same, as far as the means

of the Station will permit." The indications are, that we will be able, at first, at least, to send them to all who apply, free of charge.

EXTRACTS FROM THE EXPERIMENT STATION LAW.

Sec. 2. That it shall be the object and duty of said Experiment Stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

Bulletins Free. Sec. 4. That bulletins or reports of progress shall be published at said stations, at least, once in three months, one copy of which shall be sent to each newspaper in the states or territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster General may from time to time prescribe.

Article 2.—DEHORNING CATTLE.

By CHARLES S. PLUMB.

The subject of dehorning cattle, especially beef animals, has been the cause of considerable discussion in some states, for the past two or three years, and as a result vast numbers of cattle have been dehorned. Much has been written in relation to this subject, yet almost all of this has been in the way of simple statements either advocating or denouncing the operation.

The following matter as presented in this *Bulletin*, is the result of an effort to obtain accurate data regarding the merits and demerits of this practice.

Methods of fastening. Two methods were used for fastening the animals. When first attempted, a cow ten years of age was placed in an ordinary box-stall, with the head extending through a hole in one side of the stall. Two strong pieces of timber were placed, one on each side of the cow, one end of each resting upon

the ground about five feet behind the rear quarters, the other ends coming up through the opening containing the head, and extending on each side a short distance beyond the nose. The head was enclosed in a strong rope halter, and was fastened to the ends of the two poles, which were held in the opening so as to be immovable. The animal was thus secured.

The above plan was not satisfactory, however. Too much time was occupied in fastening the animal. Further, there was always a certain amount of twitching that could with difficulty be suppressed, so that another method seemed desirable.

A steer two years of age was cast upon a level piece of ground, and the feet were firmly fastened together at the hock joints with a stout rope three-eighths of an inch in diameter, one rear foot being laid over and fastened upon an opposite front foot, and over this latter was placed the remaining rear foot, beneath the other front foot, the last to be put in place at the point where the feet came together, after tying, a rope about 20 feet in length was fastened at its middle by taking one turn about the feet, or through the other rope. One end of this rope laid from, and at right angle to the steer's body, the other end extended directly over the body.

As in the first animal operated upon, the head was in a strong running-noose, rope halter. The rope was carried *behind* the ears, so as not to interfere with the saw. The side of the head was held closely to the ground, with one horn uppermost. Unless the soil chanced to be turfy, a handful of straw was placed beneath the head to keep it clean and to prevent dirt or rubbish of any kind getting into the cavity of the horn.

As thus fastened, a steer of ordinary strength or docility was sufficiently bound to not cause trouble during the process of de-horning. However, when the animal was vicious and struggled violently, a two-inch plank about 12 feet in length was laid across the neck, one end being held to the ground, and the other pressed down so as to bear firmly upon the neck. The rope halter was then wound once about the plank, and the animal's head drawn securely and closely to it. In this position, movement is almost impossible. This method was sufficient to enable us to dehorn with ease the wildest animals upon which we operated. The above plan of fastening was satisfactory in every way, and will serve every practicable purpose for dehorning when done on a small scale.

Yet for rapidity of work this was not entirely satisfactory. Should a stout, vicious steer be a subject for operation, difficulty may be experienced in fastening the legs. In such a case, the end of the rope halter should be passed through an iron ring

fastened six or eight feet high, and drawn up taut, thus raising the head as high as possible. A stout rope should then be fastened below the hock joint of the left rear leg, and another rope at the same place on the front left leg. The end of the rope on the front leg should be *thrown directly over* the shoulders and be brought back beneath the belly, and held loosely. The rope attached to the rear leg should be *passed under* the belly, and the end carried over the back to the left side again. When ready to be thrown, a man on each rope should pull firmly, and the animal will be cast. The halter rope should be loosened at the moment the other ropes are pulled, to enable the animal to drop freely to the ground. After falling, the feet may be safely tied.

In order to save time an attempt was made to fasten a steer to a post, binding the forehead stoutly to it, but notwithstanding how securely the head was fastened, the leverage of the body and neck enabled the animal to move the horns somewhat, so this was discarded as unsatisfactory. Further, this method of fastening enabled the animal to lunge more or less, unless the body was securely bound.

While various methods are in operation for fastening animals to be dehorned, one rarely meets with descriptions of these in the papers. The second method, which we adopted, was entirely satisfactory. Yet it is true, that, if dehorning is to be done on a large scale, as on a western ranch, a quicker process than this, that will secure the animal equally well, must be adopted. In this work but four men were found to be absolutely necessary.

Tools essential. In the first work that we did in dehorning, a saw made for this special purpose by Mr. H. H. Haaff, Chicago, Ill., and sent us by him, was used. This instrument is entirely made of iron, the back and handle being cast into one piece. It is constructed on the same principle as is the meat saw, and has an extreme length of 16 inches. The blade is very narrow (1-8 inch) and contains nine teeth to the inch. One end of this blade fits in a groove, and may be fastened there by an immovable pin. The other end of the blade is placed in a groove in a round pin that passes through a hole in the end opposite the handle. By means of a set screw on the end of this round pin containing the end of the saw, the latter may be tightened to a certain degree. We found this saw satisfactory, and yet unsatisfactory. The end of the blade held in the round pin could not be much tightened, so that it would easily turn in the wrong direction, while operating. Possibly this end was intended to have a certain amount of play to prevent the breakage of the blade in case an animal struggled violently. However, it was sometimes very unsatisfactory, and in one case the veterinary surgeon had much difficulty in guiding

the blade through the horn to the point to which he wished to carry it.

A meat saw was then obtained that consisted of three pieces; viz: handle, back, and blade fastened in grooves in the back. This proved unsatisfactory on trial, as the blade was not fastened sufficiently taut to keep it from diverging from its proper course in going through the horn, and there was no method by which it could be tightened and controlled.

Another meat saw was secured, made on much the same principle as Mr. Haaff's, only being much larger, with blade about one and a-half inch wide, and having a set screw on a pin that held one end of the saw. This pin was not round, so the end of the saw could not turn, yet the set screw enabled us to tighten up the blade as much as we pleased. This saw worked most satisfactory; first, because the blade could be properly guided; second, because of its much greater length than Haaff's saw, the horn could be cut off with more sweeping and effective strokes.

It has been mentioned that a fine cross-cut, hand saw would do for dehorning. If the steel is of first-class quality, and the saw to be used is such as is used with mortar-boxes, having a very stiff back, we see no reason why such a tool will not do very good work.

The other tools necessary besides a saw, are ropes or straps for binding. A strong five-eighths inch hempen or cotton rope, 20 feet in length, and another of three-eighths inch, preferably cotton, 10 feet long will be all that are necessary beyond the rope halter. However, if very ugly animals are treated, it will be well to have a strong half-inch rope in length 15 feet to assist in throwing.

Removing the horns. Having the animal securely fastened, the saw should be placed close to the base of the horn. Supposing the animal to be standing erect, with head in proper position, the saw blade should pass from the upper side, down laterally, or as close to the skull as possible without cutting the skin excepting perhaps one-half inch or less at the base of the horn, of the flesh which extends up it to a more or less extent.

It is essentially desirable not to remove the horn from an animal that is very much excited, as such are so much more difficult to handle. Until the work of the saw begins, moving about the animal should be done quietly. In sawing, the strokes of the arm should be firm, rapid and long as possible, and great care must be taken to keep the blade in the desired line, so that the lower part of the base of the horn will not be left more exposed from the head, than at the point where sawing began. Keep the upper part of the horn close to the stump, until entirely separated. By doing so the saw will be kept more firmly in its course, the ani-

mal will be given less pain, and blood will be less likely to bespatter the person doing the work.

We have already stated that, the most satisfactory position for the animal, that we have found, is that of lying down and being firmly tied. In this position, with a clean turfy sod, or straw beneath the head, the upper horn is sawed off. Then, by means of the long rope, fastened to the feet, the animal is easily turned upon the other side, and the remaining horn removed.

Effects upon the animal system. The following notes are quoted from the records made of two animals that were dehorned Jan. 6. "A cow ten years old. The horns were sawed off as close to the head as possible, without cutting into the flesh at the base of horn. The animal apparently suffered but little, and bled but a comparatively small amount. From each horn spurted a tiny stream of blood a distance at least five feet, and in its motion could be discerned the pulse beat of the animal. In about five minutes the spurting entirely ceased, however, and but little blood passed off."

In the case of a two year old steer, "the animal bled profusely, and suffered more than the cow mentioned above. This was evidently owing to a layer of fleshy matter about the external, basal part of the horn, that was about one-third of an inch in diameter where the saw passed through. In both cases the horn was hollow, but the shell of the cow's horn was much thinner than that of the steer's, which was quite thick. The steer, after being unbound, remained lying down, making no attempt to move, nor would he for about a minute. However he recovered rapidly from the effects of the operation." Neither of these animals gave any cry of pain.

On January 13 the class in agriculture was taken to the farm, and assisted in dehorning two steers. One animal, four years of age, made no cry when sawing off one horn, but bellowed loudly, as though suffering, when cutting the second one. The other animal made no cry.

On February 24 a steer 22 months old, while being dehorned, bellowed somewhat, and trembled violently for a time after the operation.

In order to get some very positive data concerning the effects upon the animals, of the process of dehorning, the services of Dr. A. D. Galbraith, D. V. S., a regular graduate of the American Veterinary College, practicing in Knoxville, were secured. In company with him, on March 2, the horns were removed from four steers three years of age that were undergoing a feeding experiment. Dr. Galbraith witnessed the operation in every case, and took the temperature and pulse beat of each steer, immediately preceding dehorning, before the animal became at all excited,

then directly after removing the horns, and again some time later. Steers three and four had additional observations taken upon them. The Doctor also took the temperatures and pulse beats of these animals on the morning of March 3, and the afternoon of March 6.

Steer No. 1: Bled slightly, and did not bellow. Were 20 minutes doing the entire operation, from time of taking from barn, to return. Animal was unruly.

Steer No. 2: Bellowed some, and bled to a medium extent. Complete operation lasted 18 minutes. Animal unruly.

Steer No. 3: This animal bled badly, and bellowed loudly as though in severe pain or fright.

Steer No. 4: Did not bleed very badly, nor bellow. The entire operation, from first to last occupied 10 minutes.

The above four animals were strong and healthy, ranging in weight from 1,000 to 1,200 lbs. All of them had horns of 8001 size at the base, covered with a more or less amount of flesh.

The following are the figures obtained by the Doctor, which explain themselves:

1888.	STEER NO. 1.			STEER NO. 2.		
March.	TEMPERATURE	PULSE.		TEMPERATURE	PULSE.	
	TIME.	TIME.		TIME.	TIME.	
2	2:50 p. m. 98°	2:55 p. m. 60		3:00 p. m. 99°	3:00 p. m. 60	
	3:35 p. m. 98½°	3:38 p. m. 140		3:58 p. m. 100½°	3:58 p. m. 101	
	5:05 p. m. 101°	5:06 p. m. 80		5:10 p. m. 101½°	5:10 p. m. 78	
3	8:00 a. m. 103¼°	8:05 a. m. 96		8:10 a. m. 100¼°	8:15 a. m. 84	
6	3:15 p. m. 102°	3:17 p. m. 80		3:20 p. m. 101¼°	3:22 p. m. 78	

1888.	STEER NO. 3.		STEER NO. 4.	
March.	TEMPERATURE	PULSE.	TEMPERATURE	PULSE.
	TIME.	TIME.	TIME.	TIME.
2	3:03 p. m. 99½°	3:03 p. m. 58	3:07 p. m. 98½°	3:09 p. m. 59
	4:45 p. m. 99¼°	4:47 p. m. 132	5:03 p. m. 101°	5:03 p. m. 102
	5:15 p. m. 102°	5:13 p. m. 90	5:17 p. m. 102¼°	5:16 p. m. 96
	5:27 p. m. 103°	5:27 p. m. 90	5:30 p. m. 102¼°	5:30 p. m. 96
3	8:20 a. m. 101°	8:20 a. m. 92	8:25 a. m. 100°	8:30 a. m. 90
6	3:25 p. m. 103¼°	3:30 p. m. 102	3:35 p. m. 102¼°	3:40 p. m. 90

A reference to these figures shows a very decided increase in temperature and pulse beat, even after four days. The most striking case occurred with steer No. 3, who bled the most severely of all, and who evidently suffered the greatest pain of any of the four. The increase in temperature, though slightest is noticeable.

These animals were dehorned on March 2nd. As before stated, they were a portion of six animals undergoing a feeding experiment, for beef production. Without here taking the kind of food into account, we present the following figures :

WEIGHTS OF FOUR STEERS.

March.	No. 1.	No. 2.	No. 3.	No. 4.
1	1,200 lbs.	1,170 lbs.	1,030 lbs.	1,155 lbs.
2	1,205 "	1,175 "	1,032 "	1,156 "
3	1,202 "	1,175 "	975 "	1,125 "
4	1,205 "	1,180 "	1,000 "	1,100 "
5	1,210 "	1,175 "	980 "	1,080 "
6	1,215 "	1,180 "	990 "	1,085 "
7	1,210 "	1,185 "	992 "	1,075 "
31	1,255 "	1,220 "	1,035 "	1,140 "

An examination of these figures gives the following results: No. 1 fell off three pounds the day after the operation, but the next day resumed his weight of the second day, and from then made a continual gain to the end of the month. No. 2 neither gained or lost in weight for one day, and thereafter made a steady gain. No. 3 shows a heavy loss on the third, a noticeable increase the next day, followed by another decrease on the second day after being dehorned, and thence after a constant gain. No. 4 shows the most striking loss in weight between March 2nd and 7th of the four animals, dropping from 1,156 to 1,075 lbs.

All of the above animals received the same kind of grain food, but 1 and 2 were fed ensilage, while 3 and 4 were given wheat straw, and this may account for the change in weight. Further, the rough food had been changed but recently preceding dehorning, 1 and 2 having been changed from straw to ensilage, and 2 and 3 from ensilage to straw. Hence these figures must be taken with consideration, and may not mean that the animals lost flesh from having undergone dehorning.

None of the four had much appetite for either water or dry feed at 6 p. m. of March 2nd, the day of dehorning, and No. 3 seemed somewhat indisposed for several days after. As late as April 1st one horn of this animal gave off a slight translucent, mucilaginous substance. It was further noted that those animals who appeared to suffer most from dehorning, handled the head carefully about the manger at first, and would shake it slightly at times during the three or four days succeeding the operation, as though it irritated them.

However, from the experience already had at the farm, the amount of suffering from dehorning depends very much upon the age of the animal, and the character of the horn, as we will endeavor to show in the plate on page 13.

A represents the horns from a steer of 22 months. These horns were cut off, and taken to a professional artist the same day and drawn in colors at once. The illustrations of the three sets are slightly reduced: In A, 1 is a thin, hard, oily appearing covering that entirely surrounds the bone; figure 2 is a thick, fleshy substance that extends a slight distance up the horn, this being the material that make so many horns thick at the base; this layer is quite yielding to the touch. Figure 3 represents the true bony tissue of the horn, with the cavity in the center; this tissue is very porous.

B, represents a cross section of the horns of an animal four years of age. The outer layer is 1; the next, or fleshy is 2, and 3 the inner bony tissue. B and C were drawn after the horns had been cut some days, so that the fleshy matter had shrunk some.

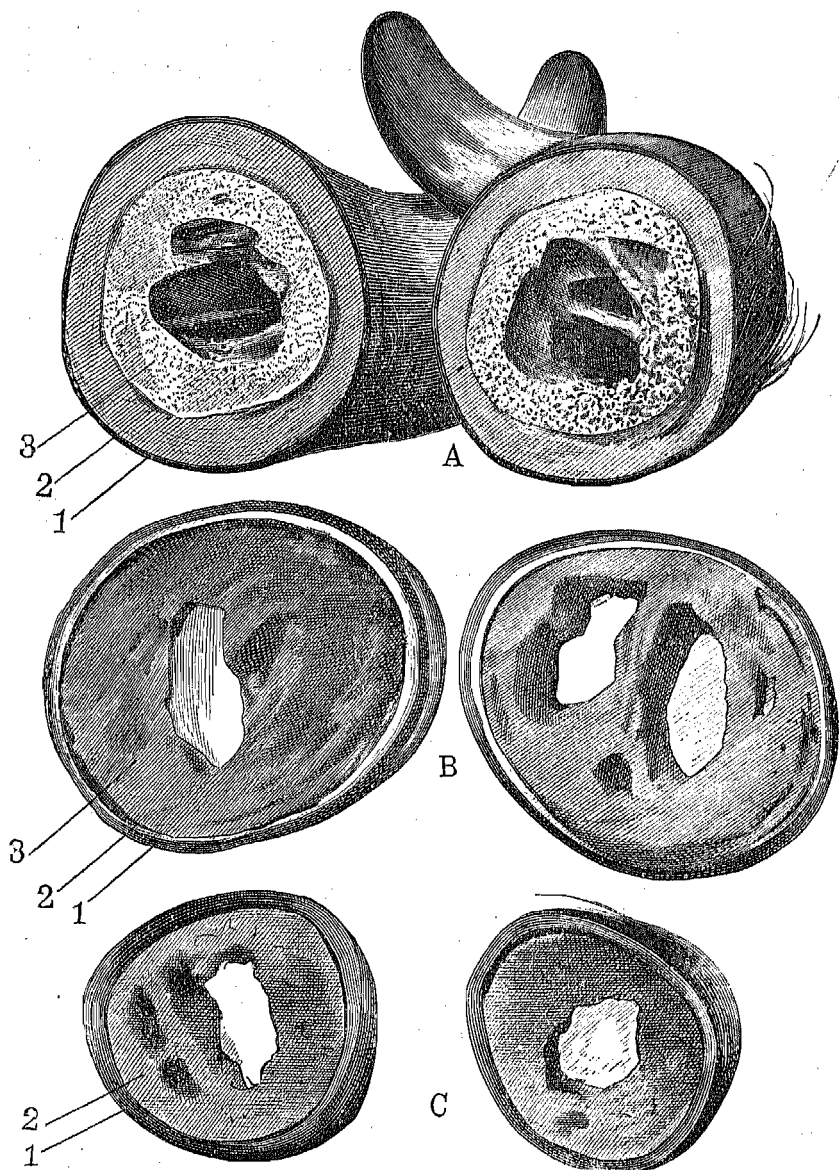


PLATE I.—CROSS SECTIONS OF HORNS.

However, in an animal four years of age, in our experience, the layer of flesh about the base of the horn is not so thick as that in a younger animal. Further, the animal that appeared to suffer most from dehorning, was the steer 22 months old, whose horns are figured at A.

The horns shown at C are from a cow 10 years old, and present but two striking layers, viz: 1, the outer, hard, bony shell of the horn proper, and 2, the bony structure within. There was almost no flesh about the base of the horn. This animal appeared to suffer dehorning almost none at all. So far as our experience will enable us to judge, the three sets of horns, A, B, and C, represent distinct conditions of development, and that, the operation of dehorning becomes less and less painful, the more we approach C from A. While there is liability of the wounds about the stump of the horn, in A, becoming sore, and maturing for some little time, as occurred in the case of a steer the same age as that of A, they rapidly heal where the amount of flesh is very slight, as occurred with C.

In no case was any substance placed over the part of the horns left on the head. As soon as the horns were removed, the animals were returned to their stalls. The cavities in the stumps if left to themselves gradually fill up, first with blood and serum and later with bony tissue, and the hairs about the horns gradually cover the stumps.

The veterinary surgeon in attendance during the dehorning of the four animals under experiment, was requested to give his professional opinion, in writing, concerning the general physical effect upon the animals, from thus sawing off the horns. His letter was as follows, this being a true copy:

KNOXVILLE, TENN.

As I am called upon to give my opinion as to dehorning cattle, I will say the operation, of amputating the horns, is very painful and not infrequently followed by evil results. It is surely a cruel practice, excepting for disease, fracture, faulty direction, deformity, and to diminish damages from vicious cattle.

Respectfully,

A. D. GALBRAITH, D. V. S.

Why dehorn? The last sentence in the statement of Dr. Galbraith explains why dehorning is practiced. Where several animals are turned together, a "master" usually is found, that uses its horns remorselessly upon the others. In such cases more or less harm comes from fighting in the way of breaking horns, hooking, etc. Further, a strong master cow will easily keep from the hay rack or water trough, a dozen others, until she is ready to go. Such a

herd of cattle is constantly quarreling, always on the move, never peacefully quiet, excepting at wide range. By removing the horns from the most powerful and vicious of these animals, the entire herd can be made more peaceful.

Twenty polled animals, will occupy, the claim is made, less room either in stalls or in shipping than the same number having large horns.

The reason for the removal of horns from the bull is very evident—simply to make the animal more defenseless, and give the herdsman better protection. A considerable number of human lives are lost each year on account of vicious bulls.

Certainly, we must admit that it is much pleasanter to feed in the manger, a polled animal, than one with long horns.

In conclusion, the prime object of this bulletin is to bring out clearly, certain facts that heretofore have been rather obscure concerning this practice of dehorning. We present the evidence as we found it. It seems clear that there are circumstances in which it is better for certain animals to be without, rather than with horns, but as to which ones, no person is so capable of judging as the one having the care of the herd. At the present time, while dehorning is being very extensively practiced in the great cattle regions of the West where beef animals are raised, but little is said in favor of removing horns from high quality, pedigreed, breeding animals. To show the extent to which this practice is being conducted, we quote as follows:*

"At the farmer's institute at Bloomington, Ill., Mr. John Evans, of El Paso, speaking on the subject, said that, since October 1, (1887) he had dehorned 3,552 cattle. Mr. Gifford of McLean said he had dehorned over 1,000."

In the *New England Homestead* of March 10, 1888, Mr. G. S. Fisher says: "In October 1886, I personally saw 120 head of cattle dehorned in Nebraska, and not one of them moaned, even under the operation, and as fast as turned out immediately went to feeding."

In the same journal for March 24, 1888, C. F. Riston, Jr., of Illinois, says: "Those dehorned between 200 and 300 head myself without a single bad case."

In the *Country Gentleman* for Feb. 23, 1888, M. D. Tallett, of Ottawa county, Kansas, says about 700 head of cattle have been dehorned in his neighborhood since last fall. In December, 1887, he assisted in dehorning 30 head of cattle, of all ages, from four months up. The cows did not shrink in milk more than one milking, and all did well. Albuminous matter ran from the holes quite profusely for about four weeks, and then all healed over.

**Prairie Farmer*, 1888, p. 157.

Mr. T. has yet to hear of a single dissatisfied person who had the horns removed from his cattle.

Summary. A review of the preceding matter, based on our own experience, indicates:

1st. The most desirable method of fastening an animal for dehorning, so as to keep it satisfactorily quiet, is to cast it, bind the feet firmly together, and hold the head in a halter close to the ground, either by the hands, or by placing a plank across the neck. To then remove the horn uppermost, and by means of a rope of sufficient length, fastened where the feet come together, to turn the animal upon the other side, and remove the remaining horn.

2nd. For removing the horns, an ordinary meat saw, with a set screw in the end of the blade furthest from the handle that will enable the blade to be tightened, but not to turn from side to side, is perfectly satisfactory. A strong running-noose rope halter, and and about 20 feet of five-eighths and 10 feet of three-eighths inch rope are also necessary.

3rd. The horns should be removed as close to the head as possible, without cutting the skull proper. It is best to cut down from one-fourth to one-half inch of flesh, at the base of the horn. The sawing should be done rapidly, and with long sweeps of the arm if possible.

4th. Animals one and two years of age appear to suffer considerably in dehorning. The painful effects decrease with increase of age, so that an animal 10 years old may suffer but very little. This is owing to the layer of flesh surrounding the base of the horn, which is much thicker in young than old animals. Dehorning causes an abnormal increase of pulsation and temperature, which extends over several days. The appetite is also affected during the 24 hours succeeding the operation.

5th. Dehorning is more especially to be recommended for those animals that are of vicious temperament, that are what are termed "masters"; to be applied to bulls, and to beef animals that are to be kept quiet and closely stabled or shipped.

6th. From evidence quoted from other sources, it appears that dehorning is not necessarily a cruel practice, but may be conducted to promote ends that are both humane and desirable in live stock breeding.